DOCUMENT RESUME

ED 215 338 CS 006 655

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TITLE Reading and Language Abilities of First and Second Graders.
PUB DATE May 82
NOTE 35p.; M. A. Thesis, Kean College of New Jersey.

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Correlation; Grade 1; Grade 2; *Language Skills; Oral Language; Primary Education; *Reading Achievement; *Reading Instruction; *Reading Readiness; *Reading Research

ABSTRACT

A study examined the relationship between the reading performance and the language skills of first and second grade students. The subjects, 24 first grade and 22 second grade students, were administered a language screening test and a reading achievement test. Test results were analyzed using the Pearson product moment coefficient correlation. Results showed that a positive relationship existed between language ability and reading achievement for both groups of students. The relationship appeared to be stronger at the second grade level. (FL)

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READING AND LANGUAGE ABILITIES OF FIRST AND SECOND GRADERS

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Submitted in Partial Fulfillment of the
Requirements for the Master of Arts
Degree in Reading Specialization

KEAN COLLEGE
May 1982

CS006655

TABLE OF CONTENTS

	PAGE
Dedication	iv
INTRODUCTION	1
Statement of the Problem	1
Hypothesis	1
Significance of the Problem	1
Definition of Terms	2
Assumptions	2
Limitations	3
Delimitations	3
REVIEW OF LITERATURE	4
DESIGN OF THE STUDY	14
Procedures Used	14
Sources and Methods of Gathering Data	14
Description of Data-Gathering Instruments	15
ANALYSIS OF DATA	18
SUMMARY AND CONCLUSIONS	20
Restatement of the Problem	20
Description of Procedures Used	20
Principal Findings and Conclusions	20
Recommendations for Further Research	21
BIBLIOGRAPHY	22
APPENDICES	25
A-Pearson Product-Moment Correlation First Grade Sample	26

PAGE

B-Pearson Product-Moment Correlation Second Grade Sample 28

C-Percentiles Corresponding to Raw Scores First Grade Sample 30

D-Percentiles Corresponding to Raw Scores Second Grade Sample 31

DEDICATION

This thesis is dedicated to Stephen for all his help, patience and support.

CHAPTER I - INTRODUCTION

I STATEMENT OF THE PROBLEM

What is the relationship between reading achievement and language ability of first and second graders?

II HYPOTHESIS

There is a significant positive relationship between reading achievement and language ability of first and second graders.

III SIGNIFICANCE OF THE PROBLEM

In the field of education it is often assumed that proficiency in language ability is a necessary prerequisite for success in reading and other academic areas. However, research to this date presents contradictory results and conclusions. In a review concerning literature related to this issue, it was reported that "the research on children's oral and written language raises doubts as to the existence of the very close and highly positive relationship some experts in language arts say exist between those two aspects of linguistic expression"(Groff, 1977).

In order to advance in our knowledge of the relationship between language and reading abilities, analysis of the pitfalls in the past research is needed, as

well as continued carefully designed studies about this topic. If further research establishes this presumed correlation, more can be done in schools to supplement the curriculum with language related materials. Readiness measures could be modified in order to reflect the importance of language ability as a predictor. High risk children could be identified and provided with appropriate remediation. If investigations do not support this relationship, our valuable classroom time will be better spent working in known areas relating to reading achievement.

IV DEFINITION OF TERMS

For the purpose of this paper, the following definitions are used.

Reading Ability

As measured by scores achieved on the California Achievement Test: Reading, levels 11 and 12, Form C,(1977).

Language Ability

As measured by scores achieved on the Bankson Language Screening Test, (1977).

V ASSUMPTIONS

It was assumed that scores obtained on the standardized test accurately reflected the students' achievement in those areas. It was further assumed that the

tests were administered under the best possible conditions.

VI LIMITATIONS

The subjects of this study were from two existing classes. As a result, the sample size was limited to twenty-four students in Grade I and twenty-two students in Grade II. Sampling procedures were not done randomly. I.Q. scores were not available for use within this investigation. The sample was also limited to the population of a Catholic School.

VII DELIMITATIONS

Conclusions of this study should not be extended beyond a population of first and second grade students attending a primarily hispanic Catholic School.

CHAPTER II - REVIEW OF LITERATURE

In examining the literature concerning the relationship between language and reading ability, contradictory findings were discovered. Therefore, the investigation of results representing both points of view was necessary in order to fully understand the status of the issue. The opinions of two experts in the field of reading will be reported along with the results of studies relating to this controversy.

Results Which Support the Hypothesis

Loban(1963) conducted a longitudinal study which followed a stratified sample of 338 kindergarteners from Oakland, California through Grade XII. He reported that a positive relationship did exist between oral language and reading. Loban also stated that the gap between oral language and reading widened each year.

In a study of 140 randomly selected fourth grade students from Bloomington, Indiana, Ruddell(1965) investigated the effect of the similarity of oral and written patterns of language structure on a child's reading comprehension. He found that differences in comprehension scores on written material with high frequency patterns of oral language structure and comprehension on written material designed with low frequency patterns of oral

language structure were significant beyond the .01 level. Ruddell concluded that a child's reading comprehension is a function of the similarity between his oral patterns of language and the language structure of what is being read.

Bougere(1969), using a random sample of sixty first grade students from a South Chicago suburb, compared the predictive value of the results on the Metropolitan Readiness Test versus the results gained from analyzing the language samples of interviews. She stated that the MRT was the best predictor of achievement in the first grade. Bougere also discovered that the predictive value of the MRT could be significantly increased by adding certain language measures.

Many studies had previously focused on the phonological, syntactic and lexical aspects of language. A morphological emphasis was applied in a study using 145 first and second grade students from a suburb in North Virginia. Its purpose was to assess the relationship between inflectional performance and reading. The results showed that there was a significant relationship and that it was higher at the second grade level(Brittain, 1970).

Calvert(1972) examined the relationship between measures of syntactic maturity in oral language and reading comprehension scores. Thirty-two fifth and sixth graders enrolled in schools from Harnett County, North Carolina were classified into reader achiever or underachiever groups based on the comprehension subtest of the

Gates-MacGinitie Reading Test. Narrative language samples were collected from the students by recording their responses to a picture shown to them. From analyzing these audiotaped language responses, it was determined that the oral language of achievers was significantly more complex than underachievers when a composite language measure was used for evaluation.

In the following correlational study, 140 first grade children from Danville, Virginia were selected and assigned to a verbal or non-verbal group based on two language tests and teacher input. Analysis was made to determine the relationship between the two groups and their reading achievement scores on the Gates-MacGinitie Test. The verbal group was found to have scored significantly better than the non-verbal group on reading achievement. The findings were said to support the theory that the ability of a child to express himself verbally was an asset to his performance in learning to read(Compton, 1972).

A study was done by Vogel(1974) using a sample of twenty dyslexic and twenty normal second grade boys from elementary schools in Evanston, Illinois. Group membership was determined on the basis of results from two silent reading comprehension tests. Nine measures were used to assess the children's syntactic ability. Vogel reported that only 10% of the normal group had syntactic problems while 99% of the dyslexic group had syntactic problems. Based on these results, she suggested that the evaluation

of reading readiness should include specific measures for syntactic abilities. This would enable teachers to identify high risk individuals before entering school.

There was a study which was designed to investigate the relationship between a child's performance in written language and his reading ability. The sample population consisted of 118 fourth grade students from a school in Victoria, British Columbia. The Balow-Hoyt New Developmental Reading Test was used as the reading criterion measure. Writing samples were requested from the students on the theme "The Last Person on Earth" and later analyzed using an experimental formula. The results of correlational analysis showed that four of the thirteen language measures used were significant predictors of reading achievement. The investigators stated that "Since language is learned more readily in oral form than written form, the development of fluency and control of syntactic complexity in oral language would seem to be the first step" (Evanechko et al., 1974).

Two experiments were reported by Ryan et al.(1977) which dealt with the relationship between various aspects of linguistic awareness and reading ability. The first investigation included a sample of ten male and ten female first and second graders from a Midwestern parochial school. Performance on linguistic awareness measures for ten children who scored above the median on the Slosson Oral Reading Test were compared with the ten who scored below

the median. The second study used twenty-two third and fourth grade remedial readers from a Midwestern public school. Linguistic measures were administered. The data for children with reading levels above the median was compared with data for below-median children. In both experiments performance on all but one linguistic task reflected the advantage of better readers over poorer readers. Results for the first and second graders were quite similar to those of the remedial reader group.

Hiebert(1980) conducted a study to examine the relationships of logical reasoning ability, oral language comprehension and home experiences to preschoolers' print awareness. The sample consisted of sixty children and their parents who resided in a Midwestern city. Children were tested on measures of print awareness, logical reasoning ability and lexical and grammatical comprehension of oral language. Information about the child's home experiences was obtained by surveying parents about their own reading habits and reading activities which they participated in with their children. Hiebert stated that logical reasoning ability, lexical comprehension and home teaching activities provided the best model in accounting for differences in a child's print awareness. She also suggested that results from this study support the theory that the acquisition of oral language and knowledge about print operates on both fronts simultaneously.

A study was designed to compare the miscues and oral

language proficiency of high and low ability readers. Twenty-two from the original sample group of forty completed the study. The subjects were individually tested on the oral section of the Durrell Analysis of Reading Difficulty. Forty-four sentences were presented orally to which the student had to decide if they did or did not make sense. The results indicated that there was a statistically significant difference in the ability of high ability readers versus low ability readers in discriminating sentences. The proportion of syntactic/semantic errors on the oral reading measure was significantly higher for low ability readers. The findings suggested that language skills relating to these elements contributed to high ability readers' superior performance(Keith et al., 1981).

In a study of seventy-five third grade Mexican-American students from a Texas public school, Perez(1981) found that extending practice in oral language skills through the elementary grades had a significant impact on students' performance in reading. The students in the experiment participated in oral language related activities for an average of twenty minutes a day over a period of over three months. Although acknowledging the limited sample of his study, Perez felt that elements or variations of his program may be successfully applied to other populations.

Results Which Do Not Support the Hypothesis

A study was done to determine if a relationship existed between the oral language of twenty fourth grade boys and their reading achievement as measured by the Paragraph Meaning subtest of the Stanford Achievement Test. Students who scored within the fifth stanine were considered the average achieving readers and those within the first two stanines were considered the low achieving readers. The boys were shown six photographs depicting sports events to elicit oral language. The only significant difference between the low and average group readers was in the mean length of the T-units. Therefore, no conclusive statement was made to support the purported relationship between oral language and reading achievement(Meisel,1975).

Mahaffey(1974) examined the relationships between two reading achievement measures at the end of first grade and (1) three selected oral language measures, (2) five readiness measures and (3) a combination of these measures. Using a sample of sixty pupils from two socioeconomic levels, relationships were analyzed separately for each group, as well as for the total sample. Results showed that no significant relationships existed between the three oral language measures and the two reading achievement measures for the total sample. A significant negative correlation was found between oral fluency and reading comprehension for the middle socioeconomic group.

The purpose of the following study was to investigate the relationship between oral language fluency of different socioeconomic status students entering the first grade and their success in reading measured at the end of first grade. The sample consisted of twenty-seven upper, twenty-four middle and twenty-three lower socioeconomic status students. Oral language samples were collected through individual semi-structured interviews and spontaneous situations. Students were given the Clymer-Barrett Prereading Battary and the Stanford Achievement Tests: Reading. The results revealed that oral language means descended in order from upper to lower socioeconomic status. The study did not present high correlations in terms of the relationship between oral language and reading. Knowledge of letter names was the best predictor of reading achievement. It was noted by the investigators of this study that knowledge of letter names is also a language measure in itself (Mae and Rush, 1977).

To examine the relationship between oral language and the readiness of preschool children, Gray et al.(1980) used a sample of seventy-four five and six year olds enrolled in preschool programs in Texas. The children in this study were chosen on the basis of their availability for testing. The Test of Language Development, the Basic School Skills Inventory and the Slosson Intelligence Test were individually administered to the children within the sample. The results of correlational analysis showed that

the language subtests and the total score on the skills inventory did not discriminate between readiness groups when intelligence was covaried.

Hammill and McNutt(1980) conducted an investigation in order to present a synthesis of research on the relationships of listening, speaking and writing to reading. The literature in twenty journals on psychology, reading, special education and speech was surveyed for the years 1950 to 1978. The proceedings of reading conferences were reviewed and references listed in bibliographies found were scanned for additional articles. Studies were included if they had a sample of at least twenty subjects at one grade level. If more than one class was included an average of fifteen subjects was needed and the age and grade level had to be statistically controlled. Eighty-nine suitable studies were found. All relationships between reading and particular variables were collected and the median coefficient was computed. Hammill and McNutt reported that the synthesis of these studies revealed a strong positive relationship between measures of written expressive language and reading. A low positive correlation was found between oral receptive language and reading. Practically no relationship was discovered between oral expressive language and reading.

Opinions Related to the Hypothesis

Weintraub(1968) felt that it was obvious that a

certain level of verbal ability was essential for successful reading, however, that level had not been determined. He stated that "possibly beyond a certain point, facility in verbal expression does not add much to one's ability to learn to read." In examining past studies, Weintraub suggested that the measures used to assess the fluency of oral language development may have been inadequate. As a final suggestion, he felt that research was needed to determine the impact of oral language instruction on reading achievement.

In an expansive review of the literature investigating the controversy relating to the degree of relationship found between oral language and reading, Groff(1977) indicated that the debate is far from being resolved. He stated that,"There is ample empirical evidence to suggest this relationship. Unfortunately there is ample research to question it."

CHAPTER III - DESIGN OF THE STUDY

I PROCEDURES USED

Twenty-four first and twenty-two second grade students from Saint Mary's School in Perth Amboy, New Jersey were chosen as the sample population for this study. Each group represented an intact class. A language test was administered individually to each child during the week of November 2, 1981. A test of reading achievement was given to each of the two groups during the following week. The first grade reading test was administered on November 10, 1981 and the second grade test was given on November 9, 1981. The scores for all tests were computed by the examiner and checked by a colleague. Results were then analyzed separately for each class using the Pearson product-moment coefficient of correlation.

II SOURCES AND METHODS OF GATHERING DATA

The language measure used in this study was the Bankson Language Screening Test(BLST). The number of correct answers on each test was added to obtain the total raw score. The maximum possible score was 153.

The California Achievement Test: Reading(CAT) was used to measure reading achievement. The children in the first grade were given Level 11, Form C. The grade range

for this level was K.6-1.9. To secure a raw score for this test, the total number of correct answers was summed. The maximum raw score which could be received was sixty. The students in the second grade were administered Level 12, Form C of the CAT. The grade range for this level was 1.6-2.9. Raw scores were computed as described for Level 11. A perfect score on this test was seventy-one.

III DESCRIPTION OF DATA-GATHERING INSTRUMENTS

The Bankson Language Screening Test was developed to provide a relatively quick method of surveying a number of psycholinguistic and perceptual skills. It was to serve as a screening device to determine areas which needed further analysis. The BLST focused on the assessment of expressive language abilities. The body of the test consisted of seventeen nine-item subtests grouped into five categories: semantic knowledge; morphological rules; syntactic rules; visual perception and auditory perception. Administration time was reported to be approximately twenty-five minutes. The test was normed on a group of 637 children between the ages of 4.1 and 8.0 years from semi-rural counties adjacent to Washington D.C.. Test-retest reliability of the BLST was determined to be r= .94. The Kuder-Richardson 20 test revealed a .96 overall reliability correlation. The concurrent validity of the test was evaluated by comparing the scores of seventy children on the BLST with their scores on three other language tests.

Resulting correlation coefficients, which ranged from .54 to .64, were said to indicate that the BLST was measuring a behavioral area similar to the other language tests. The content validity of the test was based on the fact that items in the instrument were selected as samples of tasks that language clinicians assess and remediate.

The California Achievement Test: Reading was designed to measure the reading achievement of students from the beginning of kindergarten to the twelfth grade. Level 11 consisted of sections in phonic analysis, reading vocabulary and reading comprehension. Approximate administration time was reported to be sixty-three minutes. Level 12 included sections in phonic analysis, structural analysis, reading vocabulary and reading comprehension. Its approximate administration time was seventy-five minutes. Norms for the CAT were based on a sample of about 200,000 students from kindergarten through the twelfth grade who were randomly selected from the national public and Catholic school populations. The test-retest reliability was determined to be .72 for Level 11 and .89 for Level 12. The Kuder-Richardson 20 test of internal consistency revealed a reliability correlation of .87 for Level 11 and .95 for Level 12. The validity of the CAT was reported to be established during the process of test development and did not depend on correlations with other tests. The Technical Bulletin for the CAT suggested that final evaluation of the test's validity for a particular district

should be based on that district's curriculum goals and objectives.

CHAPTER IV - PRESENTATION AND ANALYSIS OF DATA

The total range of scores on the Bankson Language Screening Test was from 94 to 146 for the first grade and from 87 to 141 for the second grade. The range of scores on the California Achievement Test: Reading was from 20 to 59 for the first grade and from 17 to 59 for the second grade.

In applying the Pearson product-moment coefficient of correlation formula to the first grade data, a moderate correlation of r= .48 was found to be significant at the .05 level(Appendix A). The second grade results revealed a substantial correlation of r= .61 which was found to be significant at the .01 level(Appendix B).

According to the test interpretation section of the BLST manual, those children who scored at the 30th percentile and below needed further language assessment. Students who scored at the 15th percentile and below were in need of clinical language instruction, while those from the 16th through the 30th percentile could benefit from a classroom enrichment approach. When scoring tests from the first grade group, three scores fell below the 15th percentile and therefore these children were in need of clinical language instruction. Three scores fell between the 16th and 30th percentile and therefore these children could benefit from a classroom approach directed to their

specific weaknesses(Appendix C). In the second grade group, two scores fell below the 15th percentile and three scores fell between the 16th and 30th percentile(Appendix D).

It was interesting to note that only one student in each sample correctly answered items thirty-five and thirty-six from the BLST. These questions were located in the Category subtest. In item thirty-five, children were asked to name two types of appliances. Item thirty-six required students to name two means of transportation.

CHAPTER V - SUMMARY AND CONCLUSIONS

I RESTATEMENT OF THE PROBLEM

This study examined the relationship between the reading achievement and language ability of first and second grade students.

II DESCRIPTION OF PROCEDURES USED

The first and second grade students were individually administered the Bankson Language Screening Test. The California Achievement Test: Reading, Level 11, Form C was given to the first grade group to measure their reading achievement. The students in the second grade were administered Level 12, Form C of the same test. The scores were computed and checked. Results were analyzed separately for each class using the Pearson product-moment coefficient of correlation.

III PRINCIPAL FINDINGS AND CONCLUSIONS

The first grade data analysis revealed a moderate correlation of r=.48 which was found to be significant at the .05 level. The substantial correlation of r=.61 was found to be significant at the .01 level for the second grade. These findings support the original hypothesis which stated that a significant positive relationship does exist between the language ability and reading achievement

of first and second grade students. Based on the results of this investigation, this relationship appears to be stronger at the second grade level.

IV RECOMMENDATIONS FOR FURTHER RESEARCH

Since the sample used represented a limited population, replication of the study, using larger and more diverse populations is recommended. Further research is needed to investigate the effect intelligence has in determining the relationship between reading achievement and language ability.

BIBLIOGRAPHY

Bankson, Nicholas W. Bankson Language Screening Test. Baltimore: University Park Press, 1977.

Bougere, Marguerite Bondy. "Selected Factors in Oral Language Related to First-Grade Reading Achievement." Reading Research Quarterly 5 (Fall 1969), 31-58.

Brittain, Mary M. "Inflectional Performance and Early Reading Achievement." Reading Research Quarterly 6 (Fall 1970), 34-48.

California Achievement Test: Reading, Levels 11 and 12, Form C. Monterey, California: CTB/McGraw-Hill, 1977.

Calvert, Kenneith C.H. An Investigation of Relationship Between the Syntactic Maturity of Oral Language and Reading Comprehension Scores. Dissertation Abstracts International 32: 4828A-29A; No. 9, 1972.

Compton, Mary Elizabeth. A Study of the Relationship Between Oral Language Facility and Reading Achievement of Selected First-Grade Children. Dissertation Abstracts International 32: 6848A-49A; No. 12, 1972.

Evanechko, Peter et al. "An Investigation of the Relationships Between Children's Performance in Written Language and Their Reading Ability." Research in the Teaching of English 8 (Winter 1974), 315-326.

Gray, Richard et al. "Is Proficiency in Oral Language a Predictor of Academic Success?" The Elementary School Journal 80 (May 1980), 261-268.

Groff, Patrick. "Oral Language and Reading." Reading World 17 (October 1977), 71-78.

Hammill, Donald D. and Gaye McNutt. "Language Abilities and Reading: A Review of the Literature on Their Relationship." The Elementary School Journal 80, No. 5 (May 1980), 269-277.

Hiebert, Elfrieda H. "The Relationship of Logical Reasoning Ability, Oral Language Comprehension and Home Experiences to Preschool Children's Print Awareness." Journal of Reading Behavior 12, No. 4 (Winter 1980), 313-324.

Keith, Claire et al. "Miscues and Oral Language Proficiency." Reading Improvement 18, No. 1 (Spring 1981), 68-72.

Loban, Walter D. The Language of Elementary School Children: Research Report No. 1. Champaign, Illinois: National Council of Teachers of English, 1963.

Mahaffey, James Perry. An Investigation of the Selected Oral Language and Readiness Factors to First-Grade Reading Achievement. Dissertation Abstracts International 36: 695A; No. 2, 1975.

Meisel, Stephen M. A Comparison of Oral Language of Average Achieving Male Readers and Low Achieving Male Readers in Fourth Grade. Dissertation Abstracts International 35: 7788-89A, 1975.

Moe, Alden J. and R. Timothy Rush. "Predicting First-Grade Reading Achievement From Selected Measures of Oral Language Performance." ERIC Documents No. 150 575, 1977.

Perez, Eustolia, "Oral Language Competence Improves Reading Skills of Mexican American Third Graders." The Reading Teacher 35, No. 1 (October 1981) 24-27.

Ruddell, Robert B. "The Effect of the Similarity of Oral and Written Patterns of Language Structure on Reading Comprehension." Elementary English 42 (April 1965), 403-409.

Ryan, Ellen Bouchard et al. "Linguistic Awareness and Reading Performance Among Beginning Readers." Journal of Reading Behavior 9, No. 4 (Winter 1977), 399-400.

Vogel, Susan A. "Syntactic Abilities in Normal and Dyslexic Children." Journal of Learning Disabilities 7 (February 1974), 103-109.

Weintraub, Samuel. "Oral Language and Reading." The Reading Teacher 21, No. 8 (May 1968), 769-772.

APPENDICES

APPENDIX A

PEARSON PRODUCT-MOMENT CORRELATION

FIRST GRADE SAMPLE

Student	BLST X	CAT Y	X^2	Y^2	XY
A	94	31	8836	961	2914
B	96	36	9216	1296	3456
C	98	20	9604	400	1960
D	102	34	10404	1156	3468
E	103	26	10609	676	2678
F	105	34	11025	1156	3570
G	114	22	12996	484	2508
H	115	22	13225	484	2530
I	115	27	13225	729	3105
J	117	32	13689	1024	3744
K	118	26	13924	676	3068
L	124	36	15376	1296	4464
M	125	59	15625	3481	7375
N	126	25	15876	625	3150
O	129	28	16641	784	3612
P	130	38	16900	1444	4940
Q	131	40	17161	1600	5240
R	131	25	17161	625	3275
S	132	35	17424	1225	4620
T	134	35	17956	1225	4690
U	137	50	18769	2500	6850
V	139	33	19321	1089	4587
W	139	38	19321	1444	5282
X	146	58	21316	3364	8468
N=24	2900	810	355600	29744	99554

$$r = \frac{\Sigma XY - \frac{(\Sigma X)(\Sigma Y)}{n}}{\sqrt{\left(\Sigma X^2 - \frac{(\Sigma X)^2}{n}\right)\left(\Sigma Y^2 - \frac{(\Sigma Y)^2}{n}\right)}}$$

$$r = \frac{99554 - \frac{(2900)(810)}{24}}{\sqrt{\left(355600 - \frac{(2900)^2}{24}\right)\left(29744 - \frac{(810)^2}{24}\right)}}$$

$$r = \frac{99554 - \frac{2349000}{24}}{\sqrt{\left(355600 - \frac{8410000}{24}\right)\left(29744 - \frac{656100}{24}\right)}}$$

$$r = \frac{99554 - 97875}{\sqrt{(355600 - 350416.67)\,(29744 - 27337.5)}}$$

$$r = \frac{1679}{\sqrt{(5183.33)\,(2406.5)}}$$

$$r = \frac{1679}{\sqrt{12473684}} = \frac{1679}{3531.8103} = 0.4753936 = 0.48$$

Degrees of Freedom = N-2 = 24-2 = 22

.404 at .05 level
.515 at .01 level } Table Values

$\therefore$ r = .48 is significant at .05 level

APPENDIX B

PEARSON PRODUCT-MOMENT CORRELATION

SECOND GRADE SAMPLE

Student	BLST X	CAT Y	X^2	Y^2	XY
A	87	17	7569	289	1479
B	102	24	10404	576	2448
C	110	32	12100	1024	3520
D	117	37	13689	1369	4329
E	117	19	13689	361	2223
F	121	26	14641	676	3146
G	124	24	15376	576	2976
H	125	40	15625	1600	5000
I	126	28	15876	784	3528
J	128	24	16384	576	3072
K	129	38	16641	1444	4902
L	131	34	17161	1156	4454
M	134	52	17956	2704	6968
N	135	57	18225	3249	7695
O	135	39	18225	1521	5265
P	136	36	18496	1296	4896
Q	136	29	18496	841	3944
R	137	40	18769	1600	5480
S	139	59	19321	3481	8201
T	139	49	19321	2401	6811
U	140	31	19600	961	4340
V	141	35	19881	1225	4935
N=22	2789	770	357445	29710	99612

$$r = \frac{\Sigma XY - \frac{(\Sigma X)(\Sigma Y)}{n}}{\sqrt{\left(\Sigma X^2 - \frac{(\Sigma X)^2}{n}\right)\left(\Sigma Y^2 - \frac{(\Sigma Y)^2}{n}\right)}}$$

$$r = \frac{99612 - \frac{(2789)(770)}{22}}{\sqrt{\left(357445 - \frac{(2789)^2}{22}\right)\left(29710 - \frac{(770)^2}{22}\right)}}$$

$$r = \frac{99612 - \frac{2147530}{22}}{\sqrt{\left(357445 - \frac{7778521}{22}\right)\left(29710 - \frac{592900}{22}\right)}}$$

$$r = \frac{99612 - 97615}{\sqrt{(357445 - 353569.14)(29710 - 26950)}}$$

$$r = \frac{1997}{\sqrt{(3875.86)(2760)}}$$

$$r = \frac{1997}{\sqrt{10697374}} = \frac{1997}{3270.684} = 0.6105756 = 0.61$$

Degrees of Freedom = N-2 = 22-2 = 20

.423 at .05 level
.537 at .01 level } Table Values

$\therefore r = .61$ is significant at .01 level

APPENDIX C

PERCENTILES CORRESPONDING TO RAW SCORES

FIRST GRADE SAMPLE

Student	Age	Raw Score	Percentile
A	6-6	94	8
B	8-0	96	4
C	6-3	98	18
D	6-6	102	18
E	7-7	103	9
F	6-9	105	26
G	6-5	114	35
H	6-2	115	35
I	6-10	115	36
J	6-9	117	36
K	6-9	118	36
L	6-10	124	43
M	6-11	125	43
N	7-2	126	52
O	6-3	129	68
P	6-11	130	64
Q	7-0	131	64
R	7-1	131	52
S	7-3	132	52
T	7-0	134	85
U	6-11	137	85
V	6-8	139	85
W	6-3	139	96
X	6-11	146	98

APPENDIX D

PERCENTILES CORRESPONDING TO RAW SCORES

SECOND GRADE SAMPLE

Student	Age	Raw Score	Percentile
A	7-9	87	4
B	7-8	102	9
C	7-10	110	16
D	7-10	117	27
E	7-4	117	25
F	7-3	121	38
G	7-2	124	38
H	7-5	125	38
I	6-11	126	64
J	7-4	128	52
K	7-5	129	52
L	7-7	131	51
M	8-0	134	80
N	7-10	135	80
O	7-7	135	80
P	7-5	136	77
Q	7-1	136	77
R	7-1	137	77
S	7-6	139	77
T	7-10	139	80
U	7-3	140	98
V	7-9	141	91